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(54) Toll ticketing record generation for billing of intersystem handoff calls in a mobile telephone system.

(57) A method and system for producing a toll ticketing record for a call with a mobile subscriber moving within the cells of at least two exchanges and generating a toll ticketing record of the call which includes sections which are related to the intersystem legs of the call.

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mation concerning the initiation and termination of a call to or from a mobile, but also additional partial toll ticketing records which reflect information concerning the use of the communications facilities of another system to serve the call. Such partial toll ticketing records enable the continued use of the present ticketing and billing routines of a mobile system but add the feature of enabling other exchanges to receive compensation for the use of these facilities.

While it is believed that the method and apparatus shown and described has been characterized as being preferred, it will be obvious that various changes and modifications may be made therein without departing from the spirit and scope of the invention as defined in the following claims.

Claims

1. A method for producing a toll ticketing record for a call with a mobile subscriber moving within the cells of a cellular mobile radio communications network which includes at least two different exchanges, an anchor exchange in which the mobile was located when the call began and a serving exchange into which the mobile moves while the call is in progress, said method comprising:
 - generating within said anchor exchange a toll ticketing record in response to the initiation of a call to which said mobile is a party, said record including a call identification number and a number identifying said mobile;
 - entering a start time in said toll ticketing record in response to an answer by the called party of said initiated call;
 - attempting a first handoff of the radio circuit of said mobile from said anchor exchange to said serving in response to said mobile moving from the cells of one exchange to the other;
 - allocating a section of said toll ticketing record for information related to an intersystem call in response of said handoff being successfully completed;
 - entering a designation in the intersystem call section of said toll ticketing record as to the identity of the exchange to which the handoff was completed;
 - entering a start time in the intersystem call section of said toll ticketing record;
 - entering a stop time in the intersystem call section of said toll ticketing record in response to either the successful completion of a second handoff of the mobile from the serving to another exchange or to termination of the call;
 - entering a stop time in the toll ticketing record in response to termination of the call; and
 - outputting and releasing the toll ticketing record.
2. A method for producing a toll ticketing record for a call with a mobile subscriber moving within the cells of a cellular mobile radio communications network which includes at least two different exchanges, an anchor exchange in which the mobile was located when the call began and a serving exchange into which the mobile moves while the call is in progress as set forth in claim 1 which includes the additional steps of:
 - attempting a second handoff of the radio circuit of the mobile from the serving exchange to the anchor exchange;
 - entering a stop time in the intersystem call section of said toll ticketing record in response to the completion of the second handoff;
 - entering a stop time in the toll ticketing record in response to termination of the call; and
 - outputting and releasing the toll ticketing record.
3. A method for producing a toll ticketing record for a call with a mobile subscriber moving within the cells of a cellular mobile radio communications network which includes at least two different exchanges, an anchor exchange in which the mobile was located when the call began and a serving exchange into which the mobile moves while the call is in progress as set forth in claim 1 which includes the additional steps of:
 - attempting a second handoff of the radio circuit of the mobile from the serving exchange to a second serving exchange;
 - entering a stop time in the intersystem call section of said toll ticketing record in response to the completion of the second handoff;
 - allocating a second section of said toll ticketing record for information related to a second intersystem call in response of said second handoff being successfully completed;
 - entering a designation in the intersystem call section of said toll ticketing record as to the identity of the exchange to which the handoff was completed;
 - entering a start time in the second intersystem call section of said toll ticketing record;
 - entering a stop time in the intersystem call section of said toll ticketing record in response to either the successful completion of a third handoff of the mobile from the second serving exchange to another exchange or to termination of the call;
 - entering a stop time in the toll ticketing record in response to termination of the call; and
 - outputting and releasing the toll ticketing record.
4. A system for producing a toll ticketing record for a call with a mobile subscriber moving within the cells of a cellular mobile radio communications network which includes at least two different exchanges, an anchor exchange in which the

mobile was located when the call began and a serving exchange into which the mobile moves while the call is in progress, said system comprising:

means for generating within said anchor exchange a toll ticketing record in response to the initiation of a call to which said mobile is a party, said record including a call identification number and a number identifying said mobile;

means for entering a start time in said toll ticketing record in response to an answer by the called party of said terminated call;

means responsive to said mobile moving from the cells of one exchange to the other for attempting a first handoff of the radio circuit of said mobile from said anchor exchange to said serving; means responsive to said handoff being successfully completed for allocating a section of said toll ticketing record for information related to an intersystem call;

means for entering a designation in the intersystem call section of said toll ticketing record as to the identity of the exchange to which the handoff was completed;

means for entering a start time in the intersystem call section of said toll ticketing record;

means responsive to either the successful completion of a second handoff for the mobile from the serving to another exchange or to termination of the call for entering a stop time in the intersystem call section of said toll ticketing record;

means for entering a stop time in the toll ticketing record in response to termination of the call; and means for outputting and releasing the toll ticketing record.

5. A system for producing a toll ticketing record for a call with a mobile subscriber moving within the cells of a cellular mobile radio communications network which includes at least two different exchanges, an anchor exchange in which the mobile was located when the call began and a serving exchange into which the mobile moves while the call is in progress as set forth in claim 4 which includes:

means for attempting a second handoff of the radio circuit of the mobile from the serving exchange to the anchor exchange;

means responsive to the completion of the second handoff for entering a stop time in the intersystem call section of said toll ticketing record;

means responsive to termination of the call for entering a stop time in the toll ticketing record; and

means for outputting and releasing the toll ticketing record.

6. A system for producing a toll ticketing record for

a call with a mobile subscriber moving within the cells of a cellular mobile radio communications network which includes at least two different exchanges, an anchor exchange in which the mobile was located when the call began and a serving exchange into which the mobile moves while the call is in progress as set forth in claim 4 which also includes:

means for attempting a second handoff of the radio circuit of the mobile from the serving exchange to a second serving exchange;

means responsive to the completion of the second handoff for entering a stop time in the intersystem call section of said toll ticketing record;

means responsive to the second handoff being successfully completed for allocating a second section of said toll ticketing record for information related to a second intersystem call;

means for entering a designation in the intersystem call section of said toll ticketing record as to the identity of the exchange to which the handoff was completed;

means for entering a start time in the second intersystem call section of said toll ticketing record;

entering a stop time in the intersystem call section of said toll ticketing record in response to either the successful completion of a third handoff of the mobile from the second serving exchange to another exchange or to termination of the call;

entering a stop time in the toll ticketing record in response to termination of the call; and outputting and releasing the toll ticketing record.